# STIC Search Report
## EIC 2800

STIC Database Tracking Number: 142674

| TO: | From: |
|---|---|
| TO: Andre Allen<br>Location: 8A34<br>Art Unit : 2855<br>Tuesday, January 18, 2005<br>Case Serial Number: 10/611535 | From: Bode Fagbohunka<br>Location: EIC 2800<br>Jeff 4A58<br>Phone: 571-272-2541<br>bode.fagbohunka@uspto.gov |

## Search Notes

Examiner **Andre Allen**

Please find attached the results of your search for **10/611535** The search was conducted using the standard collection of databases on dialog for EIC 2800. The tagged references appear to be the closest references located during our search.

If you would like a re-focus please let me know or if you have any questions regarding the search results please do not hesitate to contact me.

Bode Fagbohunka

142674

**SEARCH REQUEST FORM** **Scientific and Technical Information Center - EIC2800**

Rev. 3/19/2004 This is an experimental format -- Please give suggestions or comments to Jeff Harrison, JEF-4B68, 272-2511.

Date 1-14-05 Serial # 10/611,535 Priority Application Date 7-1-03

Your Name Anne Allen Examiner # 75079

AU 2855 Phone 571 272 7174 Room 8A51

In what format would you like your results? Paper is the default. PAPER (DISK) EMAIL

**If submitting more than one search, please prioritize in order of need.**

**The EIC searcher normally will contact you before beginning a prior art search. If you would like to sit with a searcher for an interactive search, please notify one of the searchers.**

**Where** have you searched so far on this case?

Circle: (USPT) (DWPI) EPO Abs JPO Abs IBM TDB

Other:

**What** relevant art have you found so far? Please attach pertinent citations or Information Disclosure Statements. 5513907, 6550320, 4794538, 5248918, PUB 2004/0225423

**What** types of references would you like? Please checkmark:

Primary Refs X Nonpatent Literature X Other

Secondary Refs X Foreign Patents

Teaching Refs

What is the topic, such as the **novelty**, motivation, utility, or other specific facets defining the desired **focus** of this search? Please include the concepts, synonyms, keywords, acronyms, registry numbers, definitions, structures, strategies, and anything else that helps to describe the topic. Please attach a copy of the abstract and pertinent claims.

SLIP, TIRE, TREAD WEAR, COEFFICIENTS of FRICTION, SLOPE, STIFFNESS

| Staff Use Only | Type of Search | Vendors |
|---|---|---|
| Searcher: Bruce Winsor | Structure (#) | STN |
| Searcher Phone: 22541 | Bibliographic ✓ | Dialog ✓ |
| Searcher Location: STIC-EIC2800, JEF-4B68 | Litigation | Questel/Orbit |
| Date Searcher Picked Up: 1-18-05 | Fulltext | Lexis-Nexis |

# STIC Search Results Feedback Form

## EIC 2800

Questions about the scope or the results of the search? Contact ***the EIC searcher or contact:***

**Jeff Harrison, EIC 2800 Team Leader**
**571-272-2511, JEF 4B68**

## Voluntary Results Feedback Form

- *I am an examiner in Workgroup:* ☐ *Example: 2810*
- *Relevant prior art **found**, search results used as follows:*
  - ☐ 102 rejection
  - ☐ 103 rejection
  - ☐ Cited as being of interest.
  - ☐ Helped examiner better understand the invention.
  - ☐ Helped examiner better understand the state of the art in their technology.

  *Types of relevant prior art found:*
  - ☐ Foreign Patent(s)
  - ☐ Non-Patent Literature
    (journal articles, conference proceedings, new product announcements etc.)
- *Relevant prior art **not found:***
  - ☐ Results verified the lack of relevant prior art (helped determine patentability).
  - ☐ Results were not useful in determining patentability or understanding the invention.

**Comments:**

**Drop off or send completed forms to STIC/EIC2800, CP4-9C18**

```
Set      Items   Description
S1      166751   TIRE? ? OR TREAD?
S2      288665   SLIP? ?
S3       86632   COEFFICIENT(2N)FRICTION?
S4      470547   SLOP?
S5      321934   STIFF?
S6    19873703   MEASUR? OR CALCULAT? OR DETERMIN?
S7    26267957   ESTIMAT? OR EVALUAT? OR COMPUT? OR ANALY? OR MONITOR?
S8      528469   WEAR? ? OR WORN?
S9        3368   (S6 OR S7) AND S1 AND (S8 OR WEARING?)
S10        972   (S6 OR S7) (10N) S1 (10N) (S8 OR WEARING?)
S11          1   S10 AND S3 AND S4 AND S5 AND S2
S12        697   (S6 OR S7) (5N) S1 (5N) (S8 OR WEARING?)
S13         88   S12 AND (S3 OR S4 OR S5 OR S2)
S14        442   (S6 OR S7) (3N) S1 (3N) (S8 OR WEARING?)
S15         65   S14 AND (S3 OR S4 OR S5 OR S2)
S16         52   RD (unique items)
? show files
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         (c) 2005 Inst for Sci Info
File 434:SciSearch(R) Cited Ref Sci 1974-1989/Dec
         (c) 1998 Inst for Sci Info
File  99:Wilson Appl. Sci & Tech Abs 1983-2004/Nov
         (c) 2004 The HW Wilson Co.
File  94:JICST-EPlus 1985-2005/Dec W2
         (c)2005 Japan Science and Tech Corp(JST)
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File 347:JAPIO Nov 1976-2004/Aug(Updated 041203)
         (c) 2004 JPO & JAPIO
File 239:Mathsci 1940-2004/Feb
         (c) 2004 American Mathematical Society
File  95:TEME-Technology & Management 1989-2004/Jun W1
         (c) 2004 FIZ TECHNIK
File  25:Weldasearch-19662005/Dec
         (c) 2005 TWI Ltd
File  62:SPIN(R) 1975-2005/Oct W5
         (c) 2005 American Institute of Physics
File  96:FLUIDEX 1972-2005/Jan
         (c) 2005 Elsevier Science Ltd.
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File  98:General Sci Abs/Full-Text 1984-2004/Sep
         (c) 2004 The HW Wilson Co.
File 266:FEDRIP 2004/Oct
         Comp & dist by NTIS, Intl Copyright All Rights Res
?

**11/9/1 (Item 1 from file: 347)**
DIALOG(R)File 347:JAPIO


08042654 **Image available**
**EVALUATION** OF **TIRE** **WEAR**

PUB. NO.: 2004-155413 [JP 2004155413 A]
PUBLISHED: June 03, 2004 (20040603)
INVENTOR(s): LEVY GEORGES
FANGEAT NICOLAS
APPLICANT(s): SOC DE TECHNOL MICHELIN
MICHELIN RECHERCHE & TECHNIQUE SA
APPL. NO.: 2003-290910 [JP 2003290910]
FILED: July 04, 2003 (20030704)
PRIORITY: 02 200208413 [FR 20028413], FR (France), July 04, 2002 (20020704)
INTL CLASS: B60C-011/24

ABSTRACT

PROBLEM TO BE SOLVED: To provide a **tire** **wear** **evaluation** method that can be easily conducted for vehicles equipped with an antilock braking system.
SOLUTION: This method for controlling functioning of a tire includes the steps of: determining estimations or measurements of a **slip** Gi and a **coefficient** **friction** μi most prevailing at the said **slip**, for at least one pair "i" of values (Gi, μi); determining a corresponding value of a **slope** αi of a straight line passing through an origin and the values (Gi, μi); calculating a coefficient B by direct calculation or by a regression of the values (αi, Gi) from a sufficient number of pairs so as to estimate a value of a **slope** α0 at the origin; and using the value of the **slope** α0 as an indicator of longitudinal **stiffness** of a tread pattern.


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**16/9/2 (Item 1 from file: 6)**
DIALOG(R)File 6:NTIS


1938471 NTIS Accession Number: N96-16620/2
**Tire Footprint Studies**
Chawla, M. ; Medzorian, J.
Wright Machinery Co., Durham, NC. Landing Gear Systems Group.
Corp. Source Codes: 888888888; W8120845
Sponsor: National Aeronautics and Space Administration, Washington, DC.
Aug 95 26p
Languages: English
Journal Announcement: GRAI9609; STAR3404
In NASA. Langley Research Center, Computational Modeling of Tires p 89-115.
NTIS Prices: (Order as N96-16614, PC A08/MF A02)
Country of Publication: United States
This presentation covers the results of tire footprint studies conducted in the Landing Gear Development Facility of the USAF Wright Laboratory at the Wright Patterson Air force Base, OH. **Tire** footprint studies are essential in understanding **tire wear** mechanisms and **computing tire tread wear** rates. The power input into the **tread** is the driving force for **tread wear** . Variables needed for power input **calculations** include the footprint pressure and **slip** velocity distributions. Studies were performed on the effects of power input distributions due to vertical load, camber, yaw, inflation pressure, and tire construction. For the present study, two tire constructions, one radial and the other bias, were selected. These tires were for the F-16 Block 30 fighter aircraft, both of which were previously worn. The present study was limited to steady straight roll with a 14,000 lb vertical load, a 310 psi inflation pressure, and zero yaw and camber. All tests were conducted on the Tire Force Machine (TFM) with a specialized sensor plate with embedded pressure sensors (X, Y, and Z) and **slip** sensors (X and Y). All tests were conducted for a table speed of 1 in/s. Tests on the TFM show that the power intensity distributions and total power for both tire constructions are quite similar for straight roll. Later on, tests were also conducted on a modified dynamometer which was overlaid with a grit wear surface. The tire speed was maintained at 40 miles per hour and yaw was set to four degrees. Dynamometer tests showed that radial tires have more tread wear than the bias tire; however, in the field, radial tires have longer life.
Descriptors: *Aircraft tires; *Pressure distribution; *Rolling contact loads; *Sliding; *Treads; *Wear; *Wear tests; F-16 aircraft; Grit; Traction ; Yaw
Identifiers: NTISNASA
Section Headings: 51C (Aeronautics and Aerodynamics--Aircraft)

**16/9/6 (Item 5 from file: 6)**
DIALOG(R)File 6:NTIS


0441881 NTIS Accession Number: PB-231 348/4/XAB
**Comparison of Tire Tread Wear Between Cars and Towed Trailers**
(Final rept)
Kamm, I. O. ; Jurkat, M. P. ; Jackson, T. H. ; Ehrlich, I. R.
Stevens Inst. of Tech., Hoboken, N.J. Davidson Lab.
Corp. Source Codes: 104750
Report No.: SIT-DL-72-1628; DOT-HS-801 060
Mar 74 87p
Journal Announcement: GRAI7413

Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
NTIS Prices: PC A05/MF A01
Contract No.: DOT-HS-183-2-287
Tests were conducted to **determine** if correlation could be obtained between **tire** **wear** rates experienced on automobiles and accelerated **wear** rates generated on towed trailers with the wheels set at a side **slip** angle. Fair correlation was obtained between car experience and that with trailers with free rolling wheels set at equal **slip** angle; better correlation was obtained between car experience and that with trailers with free rolling wheels set at the appropriate **slip** angle so that all tires generated the same cornering force; this level of correlation, however, was not deemed enough to be useful as a tire wear rating system. (Modified author abstract)
Descriptors: *Motor vehicles; *Trailers; *Automobile tires; Treads; Wear; Statistical data
Identifiers: NTISNHTSA
Section Headings: 85H (Transportation--Road Transportation)

**16/9/7 (Item 6 from file: 6)**
DIALOG(R)File 6:NTIS


0258089 NTIS Accession Number: AD-718 011/XAB
**Tires**
(Rept. on materiel test procedure)
Army Test and Evaluation Command Aberdeen Proving Ground Md
Corp. Source Codes: 041750
Report No.: MTP-2-2-704
24 Nov 65 16p
Journal Announcement: GRAI7107
Supersedes Ordnance Proof Manual 60-160.
Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)321-8547; and email at orders@ntis.fedworld.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
NTIS Prices: PC A02/MF A01
The Material Test Procedure describes the procedures to be followed in the testing and evaluation of tires and tubes for military service. The tests include: Durability Test - A comparative **evaluation** of a **tires** ' resistance to **wear** , impact, and surface damages as well as rubber, tread and bead design adequacy; Temperature Test - An **evaluation** of **tire** performance and **wear** when subjected to sustained high temperature; Bead **Slip** Test - A determination of the ability of tires to remain seated on the rims under maximum wheel torque conditions; Traction Test - A comparative determination of resistance to **slip** or skid on slippery surfaces, maximum performance traction on hard surfaces, and cross-country capability of tires; Run-Flat Test - An evaluation of the controllability of a vehicle with flat tires and the distance a flat tire can be operated before complete destruction occurs. (Author)
Descriptors: *Tires; Test methods; Temperature; Torque; Control; Wear resistance; Skidding
Identifiers: Common engineering test procedures; Bead **slip** tests; NTISA
Section Headings: 85D (Transportation--Transportation Safety)

**16/9/12 (Item 4 from file: 8)**

DIALOG(R)File 8:Ei Compendex(R)


04957783 E.I. No: EIP97083801499
**Title: Investigation of the slip of a tire tread**
Author: Lazeration, J.J.
Corporate Source: Goodyear Tire & Rubber Co, Akron, OH, USA
Source: Tire Science & Technology v 25 n 2 Apr-Jun 1997. p 78-95
Publication Year: 1997
CODEN: TSTCAU ISSN: 0090-8657
Language: English
Document Type: JA; (Journal Article) Treatment: X; (Experimental)
Journal Announcement: 9804W5
Abstract: **Tire** performance such as handling, noise, traction, **wear** , etc., is **determined** ultimately in the **tire** footprint. The nature of the distribution of the contact stresses within the tire footprint determine whether or not the tire tread adheres to the road or **slips** relative to the road surface. Loss of adhesion between the tire tread and the road can be extreme as in gross slippage resulting in the loss of vehicle control or it can be subtle as in the small magnitude slippage that promotes treadwear. This paper presents results from an experimental characterization of the **slip** between the tread of a free-rolling tire and a simulated road surface. Trajectories of discrete points on the tread surface were measured from the entrance to the exit of the footprint and were used to calculate the total **slip** of each point. The relationship between the average **slip** of the tire and toe angle was established. Also, the relationship between toe, camber, and the distribution of tread **slip** and velocity across the tire footprint, was investigated in this paper. (Author abstract) 1 Refs.
Descriptors: *Tires; Stress concentration; Wear of materials
Identifiers: Tire tread **slip** ; Tire footprint
Classification Codes:
818.5 (Rubber Products); 931.2 (Physical Properties of Gases, Liquids & Solids)
818 (Rubber & Elastomers); 421 (Materials Properties); 931 (Applied Physics)
81 (CHEMICAL PROCESS INDUSTRIES); 42 (MATERIALS PROPERTIES & TESTING); 93 (ENGINEERING PHYSICS)

**16/9/13 (Item 5 from file: 8)**
DIALOG(R)File 8:Ei Compendex(R)


04920024 E.I. No: EIP98014037024
**Title: New laboratory method to determine the traction and wear properties of tire tread compounds, Part II: wear evaluation**
Author: Grosch, K.A.
Source: KGK-Kautschuk und Gummi Kunststoffe v 50 n 12 Dec 1997. p 841-851
Publication Year: 1997
CODEN: KGUKAC ISSN: 0948-3276
Language: English
Document Type: JA; (Journal Article) Treatment: X; (Experimental)
Journal Announcement: 9803W4
Abstract: The paper describes a new testing facility (marketed by VMI, EPE Holland BV) using **slip** angle, load, speed and abrasive surface structure as variables to **evaluate** the **wear** performance of **tread** compounds. It is shown that the abrasion loss and the rating of compounds can be described by the energy dissipated and the forward speed of the sample. Coefficients and power indices depend on compound and abrasive

surface structure. Hence ratings of compounds depend also on these variables. Wear on the road occurs under given sets of forces and sliding speeds. By using a tire model, laboratory abrasion obtained on a particular track can be translated to road wear. Using laboratory abrasion data, the paper shows how compound ratings depend on road testing conditions. (Author abstract) 7 Refs.

Descriptors: *Chemical compounds; Tires; Traction (friction); Wear of materials; Testing; Roads and streets; Surface structure; Energy dissipation; Speed; Design

Identifiers: Tread compounds; **Slip** angle; Abrasion loss

Classification Codes:

818.5 (Rubber Products); 931.1 (Mechanics); 931.2 (Physical Properties of Gases, Liquids & Solids); 406.2 (Roads & Streets)

804 (Chemical Products); 818 (Rubber & Elastomers); 931 (Applied Physics); 406 (Highway Engineering)

80 (CHEMICAL ENGINEERING); 81 (CHEMICAL PROCESS INDUSTRIES); 93 (ENGINEERING PHYSICS)

**16/9/15 (Item 7 from file: 8)**

DIALOG(R)File 8:Ei Compendex(R)



04543160 E.I. No: EIP96110399705

**Title: Friction and wear of tire tread rubber**

Author: Sakai, H.

Corporate Source: Osaka Sangyo Univ, Osaka, Jpn

Source: Tire Science & Technology v 24 n 3 Jul-Sep 1996. p 252-275

Publication Year: 1996

CODEN: TSTCAU

Language: English

Document Type: JA; (Journal Article) Treatment: X; (Experimental)

Journal Announcement: 9612W5

Abstract: Using a flat-belt tire test machine, this study investigated causal factors in the wear of tire tread. To ensure the success of the experiment, the accuracy of the testing device was improved and the trial conditions were kept under close control. As a measure against sticky particles of worn rubber clinging to the surfaces of the safety-walk and tires, a uniform amount of mica powder was electrostatically coated onto the tire tread surfaces. Surface whiteness was measured and controlled automatically to maintain a constant level. The amount of **wear** was **calculated** by weighing the **tire** on a precision six-order electrical balance sensitive down to 0.1 g. Consequently, in a relatively short time it was possible to ascertain measurable rates of wear, and the effects of main factors on the wear rate (the weight reduction per unit distance travelled) of car tires, the linear wear rate (the weight reduction per unit distance slid), the energetic wear rate (the weight reduction per unit energy lost), and **friction coefficient** were evident. (Author abstract) 13 Refs.

Descriptors: *Tires; Wear of materials; Friction; Electrostatic coatings; Mica; Powders; Surface measurement; Surface properties; Weight control; Automobiles

Identifiers: Tire tread rubber; Treadwear; Mica powder

Classification Codes:

818.5 (Rubber Products); 813.2 (Coating Materials); 943.2 (Mechanical Variables Measurements); 931.2 (Physical Properties of Gases, Liquids & Solids); 731.3 (Specific Variables Control); 662.1 (Automobiles)

818 (Rubber & Elastomers); 813 (Coatings & Finishes); 943 (Mechanical & Miscellaneous Measuring Instruments); 931 (Applied Physics); 731 (Automatic Control Principles); 662 (Automotive Design & Manufacture)

81 (CHEMICAL PROCESS INDUSTRIES); 94 (INSTRUMENTS & MEASUREMENT); 93

by instrumented vehicle testing and data in the form of forward velocities and steer angles are used as an input to an ADAMS computer model of the vehicle. A simulation of the maneuvers generates a tire's operating environment in the form of normal load, **slip** , and camber variations, which contain all the subtle effects of the vehicle's suspension, steering, and handling characteristics. A cyclic repetition of the tire's operating environment is constructed and used to control an MTS Flat-Trac machine. In this way, accelerated tire wear can be generated in the laboratory which is directly related to the design features of the vehicle's suspension and steering systems. (Author abstract) 2 Refs.
Descriptors: *TIRES--*Wear; WEAR OF MATERIALS--Computer Simulation; AUTOMOBILES--Springs and Suspensions
Identifiers: SUSPENSION DYNAMICS; TREADWEAR; PREDICTIVE MODELS; SOFTWARE PACKAGE ADAMS
Classification Codes:
601 (Mechanical Design); 818 (Rubber & Elastomers); 421 (Materials Properties); 723 (Computer Software); 662 (Automotive Design & Manufacture)
60 (MECHANICAL ENGINEERING); 81 (CHEMICAL PROCESS INDUSTRIES); 42 (MATERIALS PROPERTIES & TESTING); 72 (COMPUTERS & DATA PROCESSING); 66 (AUTOMOTIVE ENGINEERING)

**16/9/26 (Item 1 from file: 94)**
DIALOG(R)File 94:JICST-EPlus


04626537 JICST ACCESSION NUMBER: 00A0675006 FILE SEGMENT: JICST-E
Estimation **Method of** Tire Tread Wear **Life.**
KOBAYASHI HIROSHI (1); HARAGUCHI TETSUNORI (1); KATO KOUSHI (1)
(1) Toyota Mot. Corp.
Toyota Tech Rev, 2000, VOL.50,NO.1, PAGE.50-55, FIG.14, REF.1
JOURNAL NUMBER: F0431ABU ISSN NO: 0916-7501 CODEN: TTERE
UNIVERSAL DECIMAL CLASSIFICATION: 629.33.05
LANGUAGE: Japanese COUNTRY OF PUBLICATION: Japan
DOCUMENT TYPE: Journal
ARTICLE TYPE: Original paper
MEDIA TYPE: Printed Publication
ABSTRACT: A good Tire Performance is an important factor in order to satisfactory develop vehicles. Tire wear has not only a great influence on the environment but also on the safety performance and comfortable drive. Up till now, **Tire wear** has been **estimated** by actual vehicle running tests, where wear pattern of the tire can be observed in detail. However, this method consumes a great deal of time and money. This paper proposes an **Estimation** Method in order to economically **calculate Tire Tread Wear** Life and achieve results which represent the Average Tire Life on the Market. By applying this proposed Estimation Method, 4-examples are described in this paper. (author abst.)
DESCRIPTORS: tire; lifetime prediction; wear rate; frictional force; shearing load; **slip** (mechanics); prediction technique; marketing research
IDENTIFIERS: toe-in of front wheel
BROADER DESCRIPTORS: forecast; velocity; force; mechanical quantity; load(weight); phenomena in strength of material; phenomenon; investigation
CLASSIFICATION CODE(S): QG03040V

**16/9/28 (Item 3 from file: 94)**
DIALOG(R)File 94:JICST-EPlus

Source: Jidosha Gijutsukai Gakujutsu Koenkai Maezurishu (Japan) v 952.
Coden: JGGMD8 ISSN: 0919-1364
Publication Date: 20 Apr 1995
p 109-112
Report Number(s): CONF-9505301--
Document Type: Journal Article; Conference Literature
Language: Japanese
Journal Announcement: EDB9523
Subfile: ETD (Energy Technology Data Exchange). NEDO (Japan (sent to DOE from))
US DOE Project/NonDOE Project: NP
Country of Origin: Japan
Country of Publication: Japan
Abstract: A pressure sensor more reliable than the conventional types and a tire pressure measurement system using a plurality of sensors of the said reliable type have been developed. The sensor is an inverted T in shape, the upper surface of the vertical beam thereof receives the pressure, and the two ends of the horizontal beam are fixed. The load per unit area imposed on the pressure receiving surface is separated into three components, the X and Y components in the tangential direction are sensed by the vertical beam while the Z component in the vertical direction is sensed by a distortion gauge attached to the horizontal beam. For the measurement of the contact pressure distribution for the entire contact surface, a measuring device was developed, comprising a multiple point contact pressure gauge with 30 sensors of the reliable type discussed here embedded therein, a tire rolling tester, and a data processing unit. A **tire wear estimation** test was conducted using this pressure sensor and a contact probe type **slip** sensor, and it was found that a tire of a greater friction energy ratio is easier to experience abnormal abrasion and that the new pressure sensor is useful in estimating abnormal abrasion. Further, it was indicated that the present measuring device is applicable to the analysis of the mechanism wherein shaft force results from contact pressure on the soil. 3 refs., 11 figs., 3 tabs.
Major Descriptors: *PRESSURE GAGES -- DYNAMIC LOADS; *PRESSURE GAGES -- RELIABILITY; *PRESSURE GAGES -- STRAIN GAGES; *STRAIN GAGES -- DATA PROCESSING; *STRAIN GAGES -- DETECTION; *TIRES -- PRESSURE GAGES; *TIRES -- WEAR
Descriptors: FRICTION FACTOR; STRUCTURAL BEAMS
Broader Terms: MEASURING INSTRUMENTS; PROCESSING
Subject Categories: 440800* -- Miscellaneous Instrumentation -- (1990-)
330600 -- Advanced Propulsion Systems -- Vehicle Design Factors

**16/9/40 (Item 2 from file: 350)**
DIALOG(R)File 350:Derwent WPIX


015953519 **Image available**
WPI Acc No: 2004-111360/200412
XRAM Acc No: C04-045414
XRPX Acc No: N04-088690
**Assessing** tire wear , determines **coefficients of sliding and -friction from which tread longitudinal rigidity is calculated**
Patent Assignee: MICHELIN RECH & TECH SA (MICL ); SOC TECHNOLOGIE MICHELIN (MICL ); MICHELIN TECHNOLOGIES SA (MICL ); SOC TECHNOLOGIE MICHELIN SA (MICL ); FANGEAT N (FANG-I); LEVY G (LEVY-I)
Inventor: FANGEAT N; LEVY G
Number of Countries: 036 Number of Patents: 007
Patent Family:
Patent No Kind Date Applicat No Kind Date Week

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| EP 1378378 | A1 | 20040107 | EP 200314801 | A | 20030630 | 200412 | B |
| FR 2841827 | A1 | 20040109 | FR 20028413 | A | 20020704 | 200412 | |
| US 20040049303 | A1 | 20040311 | US 2003611535 | A | 20030701 | 200419 | |
| CN 1468740 | A | 20040121 | CN 2003148267 | A | 20030701 | 200425 | |
| KR 2004004150 | A | 20040113 | KR 200344784 | A | 20030703 | 200434 | |
| JP 2004155413 | A | 20040603 | JP 2003290910 | A | 20030704 | 200436 | |
| BR 200302359 | A | 20040824 | BR 20032359 | A | 20030702 | 200458 | |

Priority Applications (No Type Date): FR 20028413 A 20020704

Patent Details:

| Patent No | Kind | Lan | Pg | Main IPC | Filing Notes |
|---|---|---|---|---|---|
| EP 1378378 | A1 | F | 10 | B60C-011/24 | |
| Designated States (Regional): AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HU IE IT LI LT LU LV MC MK NL PT RO SE SI SK TR | | | | | |
| FR 2841827 | A1 | | | B60C-011/24 | |
| US 20040049303 | A1 | | | G05B-013/02 | |
| CN 1468740 | A | | | B60C-011/24 | |
| KR 2004004150 | A | | | B60C-011/24 | |
| JP 2004155413 | A | | 18 | B60C-011/24 | |
| BR 200302359 | A | | | B60C-023/02 | |

Abstract (Basic): EP 1378378 A1

NOVELTY - At least one pair (i) of coefficients (Gi, mui) are determined. These represent the coefficient of sliding (0%=completely gripping, 100%=completely-locked skidding), and the **coefficient** of **friction** . The gradient (alphai) of the straight line passing through the origin and Gi, mui is determined. Coefficient B is calculated directly or by regression, starting from an adequate number of pairs, to calculate the value alphao at the origin. alphao is then used to calculate an indication of the longitudinal rigidity of the tread.

DETAILED DESCRIPTION - The gradient alphai is determined directly by calculation as alphai=mui/Gi. It is alternatively determined by adaptive regression. An equation for linear regression is proposed. Further equations are provided for coefficient B, in terms of alpha and G. A mean value for ao is obtained and compared with reference values for the tire under consideration, to assess the degree of tire deterioration. The residual tread thickness is estimated using H=Ho . Rigidity/Rigidityo. A mean value of alphao is found: for a set number of brakings or accelerations, and/or over a predetermined distance.

USE - To determine frictional parameters, the change in longitudinal rigidity and relative tread thickness of a tire subjected to wear.

ADVANTAGE - The method is readily used on vehicles already equipped with ABS or anti-locking braking systems, which increasingly gain acceptance. A good approximation of longitudinal rigidity of the tire is obtained; this value is related in turn to the carcass component and the tread component. The former remains sensibly constant during the life of the **tire** , whilst the **tread** **wears** . Hence the **measured** longitudinal rigidity is well-correlated with wear.

DESCRIPTION OF DRAWING(S) - A block flow diagram illustrates stages of the determination.(Drawing includes non-English language text)

pp; 10 DwgNo 1/5

Title Terms: ASSESS; WEAR; DETERMINE; COEFFICIENT; SLIDE; FRICTION; TREAD; LONGITUDE; RIGID; CALCULATE

Derwent Class: A35; A95; Q11; Q18; S03

International Patent Class (Main): B60C-011/24; B60C-023/02; G05B-013/02

International Patent Class (Additional): B60C-011/00; B60T-008/00; G01B-021/00; G01B-121-14; G01N-003/56; G01N-019/02; G05B-009/02; G05B-019/18; G05B-021/02

File Segment: CPI; EPI; EngPI

Manual Codes (CPI/A-N): A09-C; A12-T01

Manual Codes (EPI/S-X): S03-F02B; S03-F08

Polymer Indexing (PS):
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*001* 2004; H0124-R
*002* 2004; Q9999 Q9256-R Q9212; N9999 N7238-R; B9999 B5367 B5276; B9999 B3930-R B3838 B3747; B9999 B5243-R B4740; ND07

**16/9/46 (Item 3 from file: 347)**
DIALOG(R)File 347:JAPIO


07954250 **Image available**
TIRE STATE ESTIMATING DEVICE

PUB. NO.: 2004-067009 [JP 2004067009 A]
PUBLISHED: March 04, 2004 (20040304)
INVENTOR(s): KOJIMA HIROYOSHI
ASANO KATSUHIRO
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APPLICANT(s): TOYOTA MOTOR CORP
TOYOTA CENTRAL RES & DEV LAB INC
APPL. NO.: 2002-231275 [JP 2002231275]
FILED: August 08, 2002 (20020808)
INTL CLASS: B60C-019/00; B60C-023/06; B60C-023/20

ABSTRACT

PROBLEM TO BE SOLVED: To improve the estimation accuracy in a device to estimate the state of a tire by estimating one physical quantity on the tire of a vehicle from another physical quantity.
SOLUTION: The resonance frequency F of a tire, the dynamic load radius D of the tire, and the μ gradient B at which the **friction coefficient** μ of the tire is changed to the **slip** ratio of the tire are acquired by using a wheel speed sensor 10, and the pneumatic pressure x, the load y and the degree of **wear** z of the **tire** are **estimated** as the state of the tire based on the acquired resonance frequency F, dynamic load radius D and μ gradient B.



**16/9/48 (Item 5 from file: 347)**
DIALOG(R)File 347:JAPIO


07353036 **Image available**
**WEAR** STATE DETECTION METHOD AND DEVICE FOR **TIRE** , AND **WEAR DETERMINATION** PROGRAM FOR **TIRE**

PUB. NO.: 2002-221527 [JP 2002221527 A]
PUBLISHED: August 09, 2002 (20020809)
INVENTOR(s): KAWASAKI HIROAKI
NAKAO YUKIO
APPLICANT(s): SUMITOMO RUBBER IND LTD
APPL. NO.: 2001-019114 [JP 200119114]
FILED: January 26, 2001 (20010126)
INTL CLASS: G01P-003/42; B60C-019/00

ABSTRACT

PROBLEM TO BE SOLVED: To provide a wear state detection device for a tire capable of relatively correctly detecting the wear state of the tire.

SOLUTION: This device is provided with a rotation speed detection means for periodically detecting the rotation speed of the tires of four vehicular wheels, a first calculation means for calculating the vehicular speed and the vehicular acceleration/deceleration from the measurement value of the rotation speed detection means, a second calculation means for calculating **slip** rates of front and rear wheels, a third calculation means for finding mutual primary regression coefficients and correlation coefficients between the vehicular acceleration/ deceleration and the **slip** rates, a fourth calculation means for accumulating a predetermined number of the primary regression coefficients when the obtained correlation coefficients are equal to or more than a predetermined value to find the average value of the primary regression coefficients, and a tire wear detection means for detecting the wear state of the tires according to the average value.



**16/9/49 (Item 6 from file: 347)**


04512120 **Image available**
METHOD AND DEVICE FOR **DETERMINING** **WEAR** POTENTIAL OF **TIRE** **TREAD**

PUB. NO.: 06-156020 [JP 6156020 A]
PUBLISHED: June 03, 1994 (19940603)
INVENTOR(s): URAJIMIIRU ROSU
JIYON ERU TAANAA
SUCHIIBUN EMU BOSUBAAGU
APPLICANT(s): BRIDGESTONE CORP [000527] (A Japanese Company or Corporation), JP (Japan)
APPL. NO.: 05-193900 [JP 93193900]
FILED: July 12, 1993 (19930712)
PRIORITY: 7-913,573 [US 913573-1992], US (United States of America), July 14, 1992 (19920714)
INTL CLASS: [5] B60C-011/24
JAPIO CLASS: 26.2 (TRANSPORTATION -- Motor Vehicles)
JAPIO KEYWORD:R098 (ELECTRONIC MATERIALS -- Charge Transfer Elements, CCD & BBD); R131 (INFORMATION PROCESSING -- Microcomputers & Microprocessers)
JOURNAL: Section: M, Section No. 1669, Vol. 18, No. 479, Pg. 97, September 07, 1994 (19940907)

ABSTRACT

PURPOSE: To assess a wear tendency of a tire by generating a digitized image of a selected zone through watching a contact face between a tire and a glass plate and by determining a mutual engaging force, a ship amount and a wear potential between the selected zone and the glass plate as a function of the force and the **slip** amount.

CONSTITUTION: A light source 18 is provided for generating an inner-face reflecting light by illuminating the inside of a glass plate 16 of a supporting table 12, a load 24 is applied on an axle 22, and a tire 20 is loaded by the glass plate 16 through a reflection supporting sheet 26. A tread of the tire 20 is made as a digitized image signal by a CCD 28, which is received and stored by a video cassette recorder 30 and put into a micro processor 32 so that the load 24 is adjusted and calculation is executed at the same time. This calculation is to determine a mutual engaging force and a **slip** amount between a selected zone and the glass plate 16 and a wear

potential of the selected zone as a function of the force and the slip amount to be displayed on a video screen 34. Thus, a tendency of abrasion of the tire 20 can be assessed.
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